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# Bulletin o f t h e Chicago Academy of Sciences

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## Aberrations in the Color Patterns of Some Crotalid Snakes

Howard K. Gloyd

Some years ago (1935) the writer published descriptions of some snakes with conspicuously aberrant color patterns. During subsequent years friends and correspondents have continued to send me unusual and peculiar specimens to which attention has been given, although I am somewhat inclined to agree with a remark—attributed, I think, to Gertrude Stein—to the effect that the abnormal, being obvious, is actually less interesting than the normal.

The family Crotalidae is represented among these specimens by a small copperhead and several rattlesnakes, most of which are preserved in the collection of the Chicago Academy of Sciences.

The majority of these specimens are readily seen to be aberrant individuals of easily recognized species, but three rattlesnakes (*Crotalus atrox*), almost devoid of pattern and similar to each other, are sufficiently "different" to be confusing and, under some circumstances, might be mistakenly thought to represent a population meriting taxonomic recognition. It is of interest also that they are adult or near-adult ; that they were taken in the same general region in southern Texas; and that they were caught in different years by different collectors. They are described and one is figured but, on the basis of available data, speculation as to the genetic nature of these snakes does not seem to be in order here.

To the following individuals and institutions I am grateful for gifts or loans of the specimens which form the bases of these notes, and for useful comments or other assistance : Paul Anderson, Independence, Mo. ; the late Frank N. Blanchard, University of Michigan ; W. A. Bevan, Wesley Dickinson, and the late Grace Olive Wiley, Long Beach, Calif.; Charles M. Bogert and Richard G. Zweifel, American

Museum of Natural History ; Miss Laura Brodie, Chicago Academy of Sciences ; D. B. Carver, Scottsdale, Ariz.; J. Walker Davenport and R. E. Laidlaw, Witte Museum Reptile Garden, San Antonio, Tex.; W. B. Harvey, Wall, S. D.; Bob Housholder and Vic H. Housholder, Phoenix, Ariz. ; and the late A. M. Jackley, Pierre, S. D

**Agkistrodon contortrix mokeson (Daudin)**

**Northern Copperhead**

A young male copperhead with an aberration in coloration not previously encountered in the examination of several hundred specimens of this species exhibits a modification of pattern that completely alters the general appearance of the snake (Fig. 1). There are two more or less normal hourglass-shaped crossbands on the neck but those of the remainder of the body, up to the fourth from the last, do not extend upward to the midline but have coalesced evenly into broad, continuous lateral stripes, covering 5 to 7 lower lateral scale rows on each side. These stripes are darker along the upper borders and narrowly edged with white. They extend from the 31st ventral scute to the 108th. There are four hourglass-shaped crossbands anterior to the tail, the third from last incomplete across the midline and broadly fused with the fourth on the right side. On the tail are two distinct crossbands, followed by the greenish-gray tail tip. The ventral dark spots found in normal individuals have coalesced and become largely continuous. Dark pigment is unusually abundant and is distributed generally across the belly, more heavily toward the sides where the dark areas are also edged with white. The coloration of the head is normal.

There are no notable structural aberrations. This specimen has the following scutellation : scale rows 25-23-19 ; ventrals 149 ; subcaudals 43 (14 divided) ; supralabials 8-8 ; infralabials 8-8 ; other scales of head normal, except for a small azygous scale between the prefrontals at their median posterior corners, a variation not uncommon in the species. Total length 252 mm. ; tail 40 mm. ; tail/total-length ratio .159.

This specimen (CA 10725) was found beneath a stone, together with a young-of-the-year female and an adult female, 1.5 miles northeast of Atherton, Jackson Co., Missouri, Sept. 13, 1941, by Paul Anderson of Independence, Mo.

The young female (CA 10724) is normal in coloration, having 14 crossbands on the body, 3 on the tail. Scutellation : scale rows 25-23-21 ; ventrals 149 ; subcaudals 44 (8 divided) ; supralabials 8-8 ; infralabials 10-10 ; a small azygous scale at the median posterior corners of the

prefrontals, and a minute azygous scale at the posterior tip of the frontal. Total length 253 mm.; tail 38 mm.; tail/total-length ratio .150.

On the basis of size these two specimens are judged to have been collected soon after birth and may possibly be of the same brood. Their

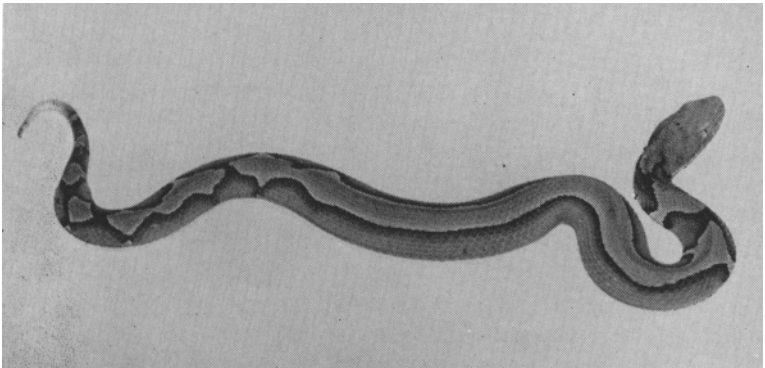


Figure 1. *Agkistrodon contortrix mokeson*, CA 10725, male, 1.5 miles northeast of Atherton, Jackson Co., Missouri.

lengths (252 and 253 mm.) are slightly greater than maxima found in newly born young (males 247, females 242 mm.) in nearby Kansas localities (Gloyd, 1934, p. 599), but this may be accounted for by growth during the six weeks before they were preserved.

The adult female (CA 10723), possibly the mother, is not unusual in coloration. There are 14 crossbands on the body, the 4th, 11th, 12th, and 13th broken at the midline and the opposite halves alternating with each other, a condition noted with a fair degree of frequency in the copperheads of Kansas and Missouri. The plates of the head are normal except that small azygous scales occur at the front and rear of the frontal, exactly as in the young female described above. Scale rows 25-23-19; ventrals 147; subcaudals 43 (14 divided) ; supralabials 8-8;

infralabials 10-10 ; total length 625 mm.; tail 82 mm. ; tail/total-length ratio . 131.

An aberrant pattern in the southern copperhead, *Agkistrodon mokeson austrinus* (= *A. c. contortrix*), in which 11 of 17 crossbands fail to meet at the midline and there is some confluence to form a broad lateral band on one side, has been described by Livezey (1949).

**Crotalus atrox Baird and Girard**  
**Western Diamond Rattlesnake**

Two small albinistic specimens from Texas are of considerable interest. CA 4360, collected by Elmer Davenport near Balmorhea, Reeves County, July 1937, was received from Dr. Frank N. Blanchard. It is a female young-of-the-year conspicuously lacking in dark pigment, but not a complete albino. Eyes gray-brown, not pink ; head nearly white all over ; body pale cream above and below ; the rhombs of the middorsal pattern, 32 in number, show only faintly, pale brown ; the four crossbands of the tail black, this the only strong pigmentation.

CA 15841, a male, seems to be completely lacking in melanins. It was collected near Camp Mullis, 25 miles northwest of San Antonio in October, 1945, by Bob Housholder, now of Phoenix, Arizona. When received at the Academy it was 417 mm. long, probably a young-of-the-year, rattle complete (of two segments), and apparently in good health (Fig. 2). Its eyes were practically colorless, pupils pink ; tongue pink, white at tip ; general color of body pale yellowish-tan ; 30 dorsal blotches, only slightly darker than ground color, their light borders showing faintly ; tail white with 5 crossbands. pink instead of black ; ventral surface translucent, heart, lung, liver, and gall bladder discernible.

At the suggestion of W. A. Bevan, this little snake was sent, in November 1945, to Miss Grace Olive Wiley, Long Beach, California, in the hope that she could rear it to adulthood and perhaps induce it to breed. Under date of May 10, 1946, Miss Wiley wrote me that it was growing fast, feeding on mice, and becoming "more beautiful at every shedding."

According to information furnished me by Wesley Dickinson after Miss Wiley's death, this snake died on October 3, 1948, age approximately three years. It was preserved and later returned to me. The specimen now shows no dark pigment anywhere ; has an incomplete, tapering rattle of 6+ segments; total length 925 mm., tail length

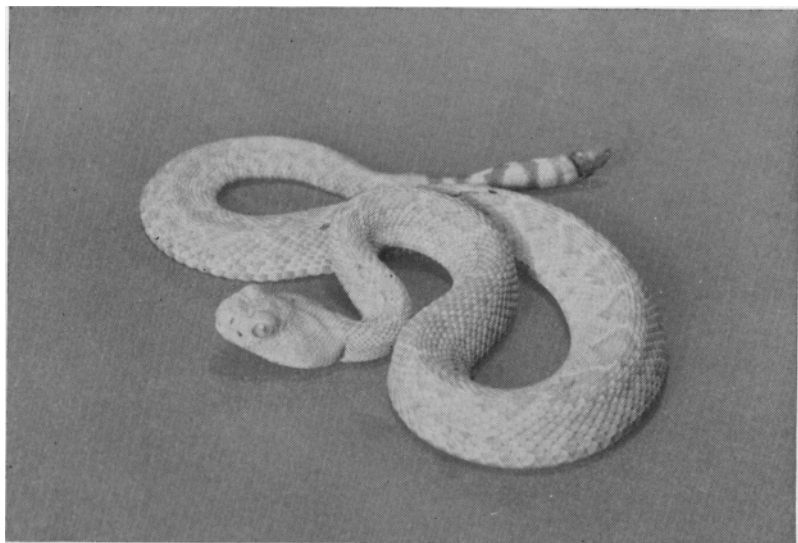


Figure 2. *Crotalus atrox*, CA 15841, male, Camp Bullis, 25 miles northwest of San Antonio, Bexar Co., Texas.

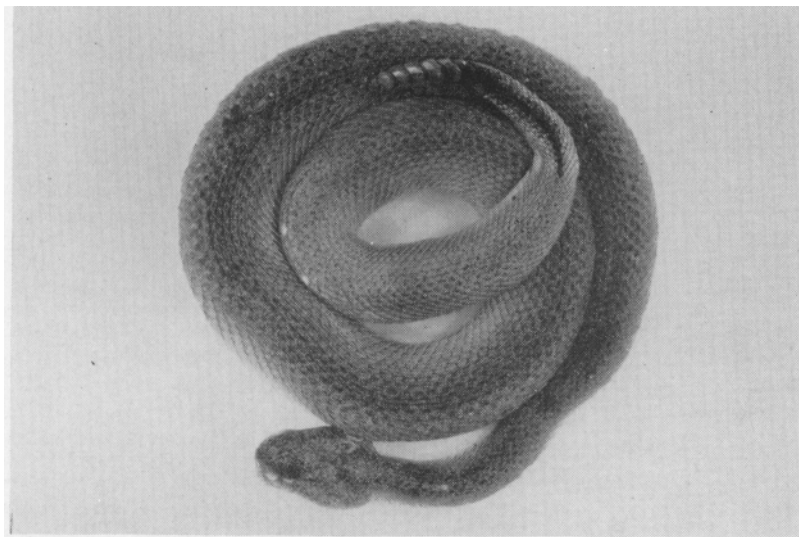


Figure 3. *Crotalus atrox*, female, Witte Museum, San Antonio, Texas.



72 mm. Its protected existence in captivity perhaps accounts for its growth and survival beyond its probable life expectancy in nature.

Three other specimens of *C. atrox* show a different kind of aberration. Two of these were sent to me for identification by the Witte Museum of San Antonio and the third is number 64797 in the collection of the American Museum of Natural History, New York, loaned to me for study by Charles M. Bogert. One of the Witte specimens ("a") was taken within the city limits of San Antonio ; the other ("b"), in "southeast Texas." Dr. Richard G. Zweifel has informed me that AMNH 64797 is listed as being from Comal County, Texas, "probably near New Braunfels," but that it was received from a zoo and bears no collector's name or date.

The salient feature of these unusual specimens is the diffused distribution of the melanins that normally form the dorsal pattern. Concentrated along the four to seven median dorsal scale rows, the brown to black pigment is more or less uniformly distributed as minute punctations with no definition of the usual rhombic pattern ( Fig. 3). On the tail the black pigment is heavily concentrated middorsally, forming a longitudinal stripe instead of a series of black crossbands. All three snakes are similar in pigmentation. Two are females and the third (Witte "b", an alcoholic skin) is thought to be a female on the basis of number of subcaudals. Some of the structural characters of these specimens are included in Table I.

Table I. Some structural characters of specimens of *C. atrox* described in text.

Museum and No.	Sex	Total Length mm.	Tail Length mm.	Scale Rows	Ventrals	Sub-caudals	Supra-labials	Infra-labials
CA 4360	♀	388	23	25	184	21	15-16	16-16
CA 15841	♂	925	72	25	178	27	15-16	16-16
Witte "a"	♀	930	55	25	182	22	15-16	18-18
Witte "b"*	♀ ?	±860	±55	25	.....	±23	.....	.....
AMNH 64797	♀	560	33	25	178	21	15-15	15-16

\*Skin, without head.

*Crotalus scutulatus scutulatus* (Kennicott)

## Mojave Rattlesnake

A specimen from Graham County, Arizona, CA 12620, a male collected July 21, 1943, 15 miles west of Safford by D. B. Carver, now of Scottsdale, is unusual in having the first 8 to 10 dorsal blotches fused together, making one long, median stripe bordered narrowly with dark brown and grayish white (Fig. 4). The next two dorsal blotches are coalesced, and there is partial fusion of others of the middorsal series farther back. The light and dark tail rings are of normal size and proportion. The ventral surface is white, almost immaculate; the underside of the tail lightly flecked and stippled with brown.



Figure 4. *Crotalus scutulatus scutulatus*, CA 12620, male, 15 miles west of Safford, Graham Co., Arizona.

Structurally this individual is close to the mean of the known variation in the following characters: scale rows 25 ; ventrals 176; subcaudals 24; supralabials 14-15; infralabials 16-16; internasals 2; scales anterior to supraoculars 12; scales between supraoculars 2 + 3. Total length 745 mm., tail 48 mm. Rattles 4+.

Cook (1955) has described and figured hybrids between *Crotalus s. scutulatus* and *C. viridis oreganus*, some of which show anomalies of pattern in which the dorsal blotches of the neck and/or posterior portion of the body have coalesced longitudinally. Such longitudinal striping in rattlesnakes normally having patterns of spots or blotches is not especially rare. It has been observed in *C. v. viridis* and *C. b. horridus* (Gloyd, 1935, p. 665, 666), and in *C. s. scutulatus* and several other species of this genus (Klauber, 1956, p. 206).

### *Crotalus viridis viridis* (Rafinesque)

#### Prairie Rattlesnake

Among the many hundreds of prairie rattlesnakes received from the late A. M. Jackley of Pierre, South Dakota, have been several anomalies, some of which were described in an earlier paper (Gloyd, 1935, p. 663-666). Klauber (1956, p. 200-206) has described three albinos and mentioned other aberrations of color and pattern in this subspecies. Four additional specimens now in the collection of the Academy are notably aberrant and form the subject of the following notes.

CA 13357, caught 12 miles south of Eagle Butte, Ziebach County, S. D., in September 1945 by Charles and Joe DeWaard, exhibits an absence of pigment on the posterior part of the body and tail, a condition to which the medical term vitiligo may be applied (Fig. 5). This pigmentless area shows up on the two lowest scale rows on both sides at about midbody and on the left extends upward across the middle a short distance anterior to the tail, and on the tail itself. The remainder of the dorsal ground color is pale olive brown. The darker brown pigment that would normally form the spots of the dorsal pattern is irregularly clumped without any approach to symmetrical arrangement. The lateral stripes on the head characteristic of this species are absent and there are no crossbands on the tail. The ventral surface is immaculate. The eyes are dark; the tip of tongue white, probably pink in life. The rattle is complete in five segments, base light gray.

CA 6165 d', collected by A. M. Jackley, 10 miles southeast of Faith, Meade County, S. D., in 1939, is generally olive brown dorsally with darker pigment diffused into small, irregular and indistinct spots, with stippling somewhat heavier toward the bases of individual scales. No lateral stripes on head. The dark pigment of the tail concentrated distally into a brownish black band 6-7 scales wide. Rattle complete in five segments, basal segment brownish black. Eyes dark. Tip of tongue

dark. Ventral surface brownish cream, lightly flecked laterally with grayish brown.

Ca 11058 9 , collected by W. B. Harvey in May 1942, 3 miles southwest of Wasta, Pennington County, S. D., is similar to the foregoing (6165) except that the dark pigment of the dorsal surface is brownish black and scattered in small flecks and stipples, giving a "peppered" appearance on hack and sides, and especially on the top and sides of the head, and on the rostral, mental, and anterior labials. The black pigment of the tail is concentrated distally into a broad, irregular band adjacent to the basal segment of the rattle, which is also black.

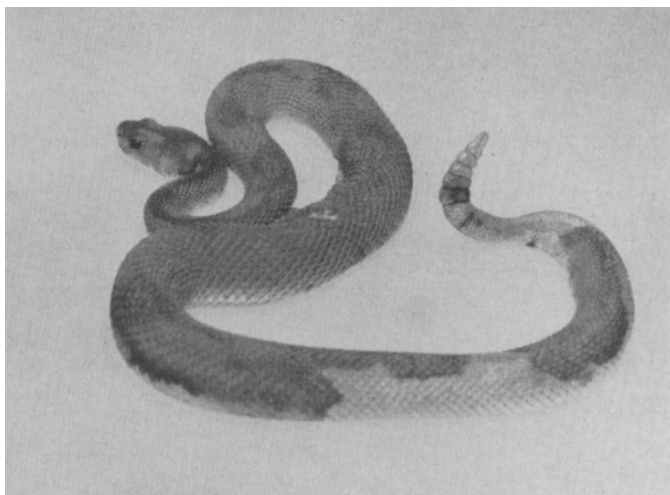


Figure 5. *Crotalus viridis viridis*, CA 13357, female, 12 miles south of Eagle Butte, Ziebach Co., South Dakota.

The rattle is incomplete, of 7+ segments. Eyes dark. Tip of tongue white, probably pink in life. The ventral coloration is cream to white, with small brown flecks, more numerous laterally.

Ca 13364 *d'*, from 8 miles northwest of Okobojo, Sully County, S. D., collected October 11, 1945 by A. M. Jackley and received by the Academy from Paul Anderson, is less abnormal than the three described above, but it would stand out in a series representing the

more usual range of coloration. The dorsal pattern is not much darker than the ground color. It consists of small transversely expanded spots without distinct edges which gradually become narrow, indistinct cross-bands posteriorly. On the tail the dark pigment is irregularly distributed ; there are no crossbands. The rattle is incomplete, of 4+ segments, base gray. There is a trace of the anterior white stripe on the side of the head, but the remainder of the head above labials is almost uniform olive brown. The ventral coloration is pale yellowish white with small, indistinct blotches laterally. Eyes dark ; tongue bicolor : one side white, the other dark. One slight structural anomaly was noted : the upper loreals are fused with the postcanthals.

In structural characters generally all four of these specimens are close to the known mean for this subspecies (Table II ).

**Table II. Some structural characters of specimens of *C. v. viridis* described in text.**

Museum and No.	Sex	Total Length mm.	Tail Length mm.	Scale Rows	Ventrals	Sub-caudals	Supra-labials	Infra-labials
CA 6165	♂	670	56	27	177	27	16-16	17-16
CA 11058	♀	820	50	27	185	22	15-15	16-16
CA 13357	♀	570	32	27	187	22	15-15	16-15
CA 13364	♂	770	60	27	177	26	15-15	14-16

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